




UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/254,119	04/16/1999	KOHEI TATSUMI	52433/545	6495
26646	7590	11/23/2004	EXAMINER	
KENYON & KENYON ONE BROADWAY NEW YORK, NY 10004			CHAMBLISS, ALONZO	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 11/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center">Office Action Summary</p>	Application No. 09/254,119	Applicant(s) TATSUMI ET AL.	
	Examiner Alonzo Chambliss	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-6, 16 and 17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-6, 16 and 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/8/04 has been entered.

Response to Arguments

2. Applicant's arguments filed 10/8/04 have been fully considered but they are not persuasive.

Applicant alleges that Matsumoto, Okuaki, and Greer all fail to disclose a metal ball being adhesive bonded to and contacted with the electrode. This is deemed unpersuasive because Matsumoto discloses metal balls 6 adhesive bonded to and contacted (i.e. by way of the flux material) with the electrode (see English abstract and all figures).

In regards to the metal balls bonded to the electrodes with a flux without reflowing. Matsumoto discloses metal balls 6 bonded to the electrodes with a flux without (i.e. prior to) reflowing (see English abstract).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claim 16 and 17, insofar as definite, are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (JP 06-333930) in view of Okuaki (JP 63-117450) and Greer (US 5,470,787).

With respect to Claims 16 and 17, Matsumoto discloses a wafer 1 comprising electrodes (i.e. pad) formed on a wafer 1, and bumps 6 each consisting of an spherically formed metal balls having a given size and adhesive bonded to and contacted (i.e. by way of the flux material) with the electrode (see English abstract and all figures). The electrodes are for the attachment of the bumps 6. The metal balls of bump 6 are only adhesive bonded to the electrodes with a flux 7 without (i.e. prior to)

reflowing (see English abstract and all figures). It is well known in the semiconductor industry that a wafer when cut forms unit semiconductor devices to form individual semiconductor chips as evident by Okuaki (JP 63-117450)(see English abstract and all figures). Therefore, Matsumoto discloses a semiconductor chip with an electrode attached to a metal ball by a flux, since a wafer when cut forms unit semiconductor devices to form individual semiconductor chips. Matsumoto does not explicitly disclose wherein each electrode includes a layer of an electrode material and at least one layer laminated to the layer of the electrode material to avoid deterioration of bonding such that the at least one layer has peripheral dimensions substantially the same as or larger than those of the electrode. However, Greer discloses wherein each electrode 22, 36, 38 includes a layer of an electrode material 36 and at least one layer 38 laminated to the layer of the electrode material 36 to avoid deterioration of bonding such that the at least one layer 38 has peripheral dimensions substantially the same as that of the electrode 22, 36, 38. The at least one layer 38 has a thickness which is smaller than that of the electrode material 22 (see col. 4 lines 49-65 and col. 5 lines 11-50; Figs. 2, 5, and 6). Therefore, it would have been obvious to incorporate the electrode including a layer of electrode material and at least one layer laminated to the electrode material with the product of Matsumoto, since the combination of the layer of electrode material and at least one layer laminated to the electrode material would provide a stable electrical connection between the chip and the substrate as taught by Greer.

5. Claim 3-6, insofar as definite, are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (JP 06-333930), Okuaki (JP 63-117450), and Greer (US

Art Unit: 2814

5,470,787) as applied to claims 16 above, and further in view of Yasunaga et al. (U.S. 5,656,863).

With respect to Claim 3, Matasumoto, Okuaki, and Greer all fail to disclose wherein the electrodes are formed from an electrode material of Cu. However, Yasunaga discloses wherein the electrodes 4 are formed from an electrode material of Al (see col. 16 lines 55-58). Therefore, it would have been obvious to one skilled in the art at the time of the invention to substitute a Al electrodes for the electrodes of Matasumoto, Okuaki, and Greer, since the Al electrode facilitates electrical connection path between the chip and an external device as taught by Yasunaga.

With respect to Claims 4 and 5, Yasunaga wherein the electrodes 4 each comprise a layer of an electrode material composed of Al and at least one metal layer made of Cu is laminated to the electrode material layer (see col. 16 lines 55-65), which Cu inherently has a melting point higher than the electrode material made of Al.

With respect to Claim 6, Yasunaga discloses wherein the at least one layer laminated to the electrode material and contacted with the electrode material layer is formed from Cu, wherein the at least one layer 8 (i.e. Sn) farthest from the electrode material layer is contacted with a low melting point metal ball by layer 9 (see col. 17 lines 1-12; Fig. 3).

The prior art made of record and not relied upon is cited primarily to show the product of the instant invention.


Conclusion

6. Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (571) 272-1927.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system Status information for published applications may be obtained from either Private PMR or Public PMR. Status information for unpublished applications is available through Private PMR only. For more information about the PMR system see <http://pair-dkect.uspto.gov>. Should you have questions on access to the Private PMR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or EBC_Support@uspto.gov.

AC/November 17, 2004


Alonzo Chambliss
Primary Patent Examiner
Art Unit 2814